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Wasting Syndrome and Quality of Life in HIV/AIDS

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Abstract

A common problem associated with HIV is the wasting syndrome characterized by unspecified and progressive weight loss accompanied by other characteristics as fever, nausea, weakness, loss of appetite and diarrhea and other kinds of nutritional deficiencies. HIV as we know is the human immunodeficiency virus which weakens up the human immune system. The consequence of which is the individuals body becomes more prone of contagious infections and attacks from other foreign bodies. The advanced stage of HIV leads to AIDS i.e. acquired immunodeficiency syndrome. This progressive stage from HIV to AIDS also depends upon the viral load within the individual's body. Wasting syndrome occurs with HIV and is also prevalent and common with HIV related opportunistic infections viz. malaria, TB, malignancies etc. This review explores as to the common wasting syndromes associated with HIV infection.

Method: PubMed, Medline, Science Direct and PsycINFO databases were searched to trace the studies and researches concerning the topic. We limited our search between the years 1999-2009. The quality of life issues were explored among the people diagnosed with HIV/ AIDS.

Discussion: Regular usage of HAART (highly active anti-retroviral therapy) has been found to seriously hampering the quality of life of HIV positive individuals. Hypogonadism has also emerged as a significant predictor of poor quality of life and mood disturbances among the HIV affected males.

Keywords: HIV/AIDS; Quality of Life; Wasting Syndrome; HAART; Hypogonadism

Introduction

Acquired immune deficiency syndrome (AIDS) is a noxious disease of the human immune system caused by the human immunodeficiency virus (HIV). The disease progressively reduces the efficiency of the immune system and makes the patients more susceptible towards many infections. HIV is transmitted by direct contact of a mucous membrane or the bloodstream including blood, semen, vaginal fluid etc. through blood transfusion, contaminated hypodermic needles, exchange between mother and baby during pregnancy, childbirth, breastfeeding, or other means of exposure to one of the above bodily fluids [1-5].

Although available treatments for AIDS and HIV can slow the course of the disease, but, currently there are no permanent treatments for AIDS. Antiretroviral treatment reduces both the mortality due to HIV infection, but routine access to these antiretroviral drugs is not available in all countries. Due to the complexity in treating HIV infection, preventing infection is the only aim for controlling the AIDS to become pandemic. Different health organizations have started various programs to promote safe sex and needle-exchange program to slow the spread of the virus. The origin of AIDS as well as HIV has mystified the scientists when the disease first came to light in the early 1980s. For over thirty years it has been the fascinating area for research and debate.

HIV is considered to be one of the most overwhelming diseases in the recent past. Human Immunodeficiency Virus (HIV) is a virus that causes the disease Acquired Immunodeficiency Syndrome (AIDS) in an individual. HIV weakens the individual's ability to fight the infections thus weakening the immune system. HIV is transmitted through direct contact with mucous membrane or the bloodstream with a bodily fluid containing the virus such as blood, semen, vaginal fluid breast milk etc. AIDS is now considered to be a pandemic affecting the population worldwide. Genetic research reveals that AIDS first originated in west- central Africa during the late nineteenth and early twentieth century [6-10].

Wasting in patients with HIV/AIDS is a condition calling medical attention along with a social shriek. In 1987 the Centers for disease control and prevention revised its definition of AIDS to AIDS Wasting (AW). Researchers found that hypogonadal HIV-infected men treated with testosterone gained in lean body and muscle mass, in addition to reporting benefits related to quality of life and overall well-being. Women with an androgen deficiency concordant with AWS also reaped the benefits of increased quality of life and well-being, when using testosterone. The use of testosterone may help in staving off AIDS wasting syndrome (AWS), according to recent data. Studies have indicated that testosterone levels are low in over half of all men with AIDS, and hypogonadism is seen to increase with the progression of the disease. Hypogonadism is often related to the effects of severe illness, malnutrition, and opportunistic infections. The condition in HIV-infected patients often manifests in loss of muscle mass, fatigue, and reduced quality of life. Loss of lean body mass is often associated with increased mortality [11].

In a study it was found that unintentional loss of weight and lean body mass (wasting) is a major cause of morbidity and mortality in

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patients with acquired immunodeficiency syndrome (AIDS). Patients with AIDS wasting (AW) often experience reductions in lean body mass, muscle strength, and the ability to perform functions of daily living. Dependence on assistance with activities of daily living may be associated with a lower quality of life (QOL) and higher risk of mortality [12]. These factors suggest that slowing or reversing the loss of lean body mass in AW can improve well-being. Nutritional support or appetite stimulants in the absence of exercise therapy or growth hormone supplementation can increase fat without improving body composition, whereas appropriate exercise programs, androgen therapy, and recombinant human growth hormone (rhGH) therapy may increase lean body mass in patients with AW. Resistance exercise programs can increase muscle strength and lean body mass. In addition, both resistance and endurance (aerobic) exercise augments endogenous growth hormone levels, decrease depression, enhance self-esteem, and may improve immune response. Randomized, double-blind trials have shown that rhGH therapy increases total body weight, lean body mass, exercise capacity, and QOL. In summary, interventions that improve exercise capacity and functional performance may enhance QOL in patients with AW and may reduce mortality in this group.

Hypogonadism is prevalent among human immunodeficiency virus-infected men, in whom significantly reduced quality of life and mood disturbances have been reported. In a recent study, Barret-Connor et al. demonstrated a significant inverse association between bio available testosterone concentration and Beck depression score that remained significant after controlling for age, weight, and other factors [13-16].

HIV-infected patients had worse overall QOL and survival than uninfected patients. QOL differences were more marked in the areas of functional, physical and social well-being than in the area of emotional well-being. HIV-infected patients had lower income and were less likely to have private insurance and more likely to have diffused large B cell histology than uninfected patients.

Method

The author relied upon database search for relevant publications and review articles. PubMed, Medline, Science Direct and PsycINFO databases were explored to trace relevant articles on wasting syndrome and HIV. After identifying those articles that were directly significant with the title of this article, were identified and read thoroughly. Among all the above mentioned database searches PubMed contained maximum number of relevant review articles on AIDS wasting syndrome (AWS), HIV and quality of life.

The database search was performed using the following keywords: wasting syndrome and HIV, Quality of life and HIV, Effect of HIV on quality of life and AWS and quality of life. The search was limited to English language and we included only those review articles over the last ten years from 1999 to 2010. Publications that did not contain relevant and updated information were not included in the literature review. Rest all the full text articles were reviewed in detail to discover the effect of wasting syndrome on quality of life [17].

Human Immunodeficiency Virus (HIV)

HIV belongs to class retroviruses and within the class, they are placed in subgroup lentiviruses. Unlike other organism, retroviruses have genetic material composed of RNA (Ribonucleic Acid) and their replication processes are found to be little more complicated than others. Lentivirus are slow virus i.e. they take such a long time to produce any adverse effects in the body and have been found in a number of different animals, including cats, sheep, horses and cattle. Like all the lentiviruses, HIV also attacks the immune system. It is very interesting that the HIV is the descendant of Simian Immunodeficiency Virus (SIV) that affects monkeys because certain strains of SIVs show very close similarities to HIV.

Wasting syndrome

AIDS wasting is the involuntary loss of more than 10% of body weight, plus more than 30 days of either diarrhea, or weakness and fever. Wasting is linked to disease progression and death. Losing just 5% of body weight can have the same negative effects. Wasting is still a problem for people with AIDS, even people whose HIV is controlled by medications. Part of the weight lost during wasting is fat. More important is the loss of muscle mass [18,19] .

Causes of Wasting Syndrome: Currently, the precise causes of the HIV wasting syndrome are not well known, and probably vary among individuals. However, a growing body of evidence suggests that many factors may contribute to wasting including inadequate dietary intake, malabsorption of nutrients, abnormalities in metabolism and energy expenditure, and HIV-related infections. Factors associated with HIV/ AIDS wasting syndrome are enumerated below.

Low Food Intake: Low food intake is one of the most common factors associated with HIV/ AIDS. Doses prescribed for such treatment drugs are either empty stomach or with the meal which basically force the individual to eat without feeling hungry. The side effect of such drugs also lowers the food intake of individual. Opportunistic infections' (OI's) in throat, mouth and gums can also make it a painful concern to eat properly. Lastly, lack of money and poverty can also be a prime concern for low food intake [21-25].

Poor nutrient absorption: The absorption of nutrients is regulated and controlled by the small intestine. In people with HIV infection this process of nutrition absorption is disrupted due to several opportunistic infections which lead to reduced nutrition absorption.

Altered metabolism: As already mentioned the food processing and nutritional absorption is already lowered and disrupted. Before the symptoms actually show up, people feel increased energy output. This is usually caused by the increased activity of the immune system. People diagnosed with HIV/ AIDS generally need more calories than others so as to maintain their body weight.

Impact of wasting syndrome on body physiology: The body resistance power and endurance reduces and gets weaken up due to HIV infection. The physical fitness and exercise capacity also reduces due to HIV. Psychosocial and cognitive difficulties due to disease, coupled with muscle weakness, may render patients with AIDS both mentally and physically unable to perform basic ADLs (activities of daily lives), such as bathing, grooming, dressing, eating, communicating, and preserving continence. As the disease progresses, such factors as fatigue, shortness of breath, visual impairments, cancers, opportunistic infections, and cardiovascular problems increasingly limit the ability of patients to perform these

Figure 1: HIV-1, colored green, budding from a cultured lymphocyte.

activities. As patients become less physically fit and ambulatory, opportunities for social interaction and independent living continue to decrease. Consequences can include isolation, depression, loss of professional and social life, and other lifestyle changes that may contribute to disease progression (Figure 1) [26-29].

People diagnosed with HIV can advance up to the level of AIDS when they develop a range of opportunistic infections like TB, malaria, malignancies etc or when there CD4 count is less than 200. HIV directly attacks and destroys CD4 cells which are a subtype of white blood cell responsible for fighting foreign infections within the body. As the CD4 cell count of an individual gets lowered they become more susceptible to infection. As the HIV enters the cell it quickly starts to replicate intracellularly by killing the lymphocyte cells and disrupting the proper functioning of the CD4 cells and also affecting macrophages along with dendritic cells.

Structure of HIV

HIV exists as roughly spherical particles (i.e. Virions), having studded with lots of little spikes, outside the human cells. Unlike bacteria, HIV particles are too small to be seen through an ordinary microscope. One HIV particle's diameter is about 0.1 microns (i. e. 1/20th of the length of an E. coli bacterium) and they can be seen clearly with an electron microscope. Each particle is surrounded by a fatty coat, called as viral envelope, from which, about 72 little spikes made up of gp 120 and gp41protein are projected. A matrix layer made up of p17protein is also present just below the viral envelop. A bullet- shaped viral capsid (core) is present which is made up of p24protein. For HIV replication, there are three enzymes viz. reverse transcriptase, integrase and protease required, which are present inside the viral core. The genetic material of HIV (double stranded RNA,), is also present inside the viral capsid. In totality, HIV has only nine genes, three of them are gag, pol and env, code for structural protein of new virus particles and the other six genes are tat, rev, nef, vif, vpr and vpu, required for the proteins that are involved to control the infection cycle of HIV. To control HIV replication, a sequence called long terminal repeat, is also found at either end of each RNA strand.

The one important characteristics of HIV i.e. the ability to regulate their own expression, makes them different from other retroviruses [39]. The sequence necessary for activation and termination of transcription are present in the long terminal repeat (LTR) regions at the ends of the viral genome, but an important element of control occurs through RNA processing or splicing.

Life- cycle of HIV

Invasion of the HIV: The viral particles infect the cells that carry the CD4 protein on their surface. The spikes, present on the virus surface, stick to the CD4 that allow the viral envelop to fuse to the cell membrane that results the release of whole contents of the HIV particle, leaving the envelop out of the cell. The above fusion process is triggered by a conformational change in the env protein which exposes a hydrophobic domain located on N- terminus of the gp41. The exposed domain inserts into the target cell membrane and initiates the fusion. Unlike other RNA viruses, the entry of HIV-1 occur at neutral pH and endocytosis of viral particle is not required [32,34].

HIV types: Since, HIV is a highly variable virus, so they have different strain, even in single infected human body. On the basis of genetic resemblance, these strains may be classified into types, groups and subtypes. HIV-1 and HIV-2 are the two types of HIV. Both of them are transmitted by sexual contact, through blood, and from mother to child. Transmission of HIV-2 is more complex than HIV-1. The time period between initial infection and disease development by HIV-2 is also longer than HIV-1.

HIV-1: HIV-1, the more virulent, pandemic strain of HIV, corresponds to SIV cpz, found in chimpanzees. The SIV become HIV through "zoonosis", the viral transfer between animals and humans.

HIV-2: HIV-2 shows resemblance with SIVsm, found in Sooty Mangabeys or white-collared monkey rather than chimpanzees. It is thought that the transformation of SIV to HIV-2 in human is happened in a similar way i.e. by consumption of monkey meat. HIV-2, the second type of AIDS virus in the class of human retrovirus, shows similarity in many virological and biological properties with HIV-1, for example, both are transmitted by the same route, both infecting the same cells and both of them have same considerable genetic variations in the gene of outer envelope. But the study of both the viruses suggests that HIV-2 infected people have some distinct biological differences between these related viruses [30,36]. Some of the unique features include its distinct global distribution with limited spread, less infectious and less progressive [30]. Consequently, it was found to infect fewer people and also restricted in few countries of West Africa. Thus, in other words, HIV-2 and HIV-1 have unique and striking differences in their geographic distribution, epidemic trends, perinatal and heterosexual transmission rates and incubation periods for the manifestation of AIDS. The genetic diversity of HIV-2 is less extensive, as has only 2 subtypes A and B [37,38].

They are spherical, 100- 120 nm diameter and morphologically similar to the HIV-1. The entire genome size (~ 9 Kb) and conservation among open reading frames are also similar to those of HIV-1 but, the regulatory gene sequences show more variation among HIV-2 than HIV-1s [33,55,52]. HIV-2 has one gene, named as vpx that is not found in HIV-1 [20] (Franchini, et al., 1989). The LTR of HIV-1 is more responsive to cellular activation signals than the HIV-2 LTR, indicating that HIV-2 has different response elements [35] (Tong-Starksen,et al., 1990). Whereas, HIV-1 has two NF-kB enhancer binding sites, but only one can be identified for HIV-2 or most SIVs

Figure 2: Symbol for AIDS Awareness.

(Arya, et al., 1988)

Tests for HIV: Since, HIV-2 and HIV-1 group O are the rarer strain of HIV, thus, the earlier development and evaluation of different diagnostic tests (ELISA test) were primarily based on major subtype of HIV isolated from North America and Europe. Some of the much more sensitive rapid tests for detection of more divergent strains like group O as well as group M subtypes and also for HIV-2 are also available (Phillips et al, 2000). In addition to ELISA test and viral load assays for screening and diagnosis, new serologic tests to detect recent infection have also been developed (Parekh, 2001). The viral load test measures the amount of HIV particles in a blood sample [40-45]. This test shows the controlling parameter of immune system to neutralize the virus. The commonly used viral load tests are:

- HIV RNA amplification (RT-PCR) test
- Branched chain DNA (bDNA) test

Vaccine development: The variety of HIV subtype, genetic make-up of human population affected and their route of HIV exposure may affect the development of AIDS vaccines. Vaccines for one strain can trigger immune response for that strain not for other strain. There are two types of vaccines proposed for AIDS prevention and cure. The 'preventive vaccines' should stop the infection whereas, 'therapeutic vaccines' would delay disease in people who are already infected. The first one could be the ideal vaccine and the second one could show highly beneficial effects.

The basic thought behind all proposed AIDS vaccines is to encourage the human immune system to produce antibodies that would block the entrance of HIV into the human cells, but this idea was failed in clinical trials because the antibodies, produced through vaccination, were worked well only against lab-cultured HIV, not against the wild strains of the virus [46-50]. There are big challenges for scientists to develop AIDS vaccines due to various rationales, including

- HIV destroys the immune cells, produced against them.
- HIV enters into the genetic material of human, just after infection and hidden themselves from immune system.
- HIV exists in various subtypes that are very different to each other and constantly changing.
- There are no good animal models for experimental validation of the vaccines.

In 2008, the public, charitable and private sectors invested millions of dollars in research and development of preventive AIDS vaccine. International AIDS Vaccine Initiative (IAVI) and Global HIV/AIDS Vaccine Enterprise also helps to coordinate research and promote scientific cooperation and collaboration.

Treatment failure: Three types of treatment failures happen. Generally, these failure happen in the following order, virologic failure, immunologic failure and then clinical progression. Virologic failure happen when anti-HIV drug cannot reduce the viral load, whereas, Immunologic failure occur when the immune system of patient does not show response to anti-HIV drug and clinical progression happens when the symptoms of HIV persists even with the taking of drug. Some factors that increase the treatment failures are:

- Previous treatment failure
- Drug resistance
- Poor treatment adherence
- Anti-HIV drugs are poorly absorbed by the body
- Other illnesses or conditions
- Poor health before starting treatment
- Side effects of medications or interactions with other medications
- Substance abuse leading to poor treatment adherence

Reverse Transcription and integration: After invasion, the enzyme reverse transcriptase converts the viral RNA into DNA that is compatible with human genetic material. The reverse transcription can occur in both resting as well as activating T cells (37) but the next step, i.e. entry of these reverse transcribed DNA (Pre integration complex) to the nucleus does not perform in resting cells due to unavailability of sufficient metabolic energy (Bukrinsky, et al., 1992). Thus in the resting cells, the DNA exist in cytoplasm for few days, acting as labile reservoir of virus and then go to degradation process (if the T-cells is not activated) (Bukrinski, et al., 1991). After the transportation of DNA to nucleus, they are integrated with human DNA with the help of integrase enzyme. After integration the viral DNA is called as provirus.

Transcription and translation: The provirus can remain dormant for a long time. But after activation of the cell, the HIV genes first converts in to messenger RNA, by using human enzymes, and transported outside the nucleus for producing new HIV proteins and enzymes.

Quality of life: The term quality of life is used to define and evaluate the general wellbeing of an individual. An important consideration in medical care, quality of life refers to the patient's ability to enjoy normal life activities. Some medical treatments can seriously impair quality of life without providing appreciable benefit, while others greatly enhance quality of life. According to ecological economist Robert Costanza, "while Quality of Life (QOL) has long been an explicit or implicit policy goal, adequate definition and measurement have been elusive. Diverse "objective" and "subjective" indicators across a range of disciplines and scales, and recent work on subjective well-being (SWB) surveys and the psychology of happiness have spurred renewed interest". Every individual holds a different view regarding the meaning of quality of life. The ability to walk, talk, see and feel all contributes to our overall quality of life. A quality life is

a life full of meaning and purpose. The components which determine the quality of life of individuals are happiness, good health, stability, happiness, meaning and relationships.

QOL outcomes measure individual's satisfaction with their lives. Because these outcomes are by definition subjective, they are influenced by many factors. Measures of QOL may be highly relevant to assessing the health status of the patient with AW because they reveal how patients perceive their own disease states. A patient's level of physical functioning is an important determinant of QOL, as are psychological and emotional factors, such as self-image, self-esteem, isolation, embarrassment, and fear. The burden of HIV can be diagnosed by determining the impact of quality of life among the HIV/ AIDS patients. The social stigma and discrimination attached with such disease at times may force an individual to change job and place adding on the level of stress on the already adverse economic condition. Such condition may lead to further deterioration of health, low morale, low productivity of work etc. Thus social isolation and economic deprivation takes a toll on the quality of life in individuals with HIV/ AIDS [51].

Quality of life is taken to be a multi-dimensional construct. Quality of life is defined as, "an absence of pain or an ability to function in day to day life". At other places, researches have shown quality of life as a "fighting spirit" associated with longer survival times for individuals. Quality of life relates both to adequacy of material circumstances and to personal feelings about these circumstances. It includes "overall subjective feelings of well-being that are closely related to morale, happiness and satisfaction". WHO has defined quality of life as "individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns". In a study it was found that quality of life was determined by education, income, occupation, family support and clinical categories of the individuals with HIV/ AIDS. Good social support from the family along with occupation provides better environment for individuals suffering with HIV. Higher level of education also provides for greater likelihood of possessing better psychological capabilities/ capabilities to cope with the disease and infection.

Wasting Syndrome and quality of life: Quality of life has been observed to be severely hampered in individuals with HIV. The regular usage of highly active anti-retroviral therapy (HAART) is associated with side effects and poses a challenge to both physician and patient. Some researches show that HAART associated diarrhea as a minor side effect of the drug. Good quality of life also depends upon strict adherence towards the drug therapy that might carry some serious side effects and also requires lifelong commitment. In a study by Jennifer et.al (2008) it was found that individuals affected with HIV/ AIDS have a potential positive adjustment following stress management interventions. Studies have revealed a positive change in perceived stress, global psychological functioning, social support and quality of life among the HIV stuck individuals. It has been revealed in researches that hypogonadal HIV infected men treated with testosterone gained in lean body mass and muscle mass and reported of experiencing a better quality of life and overall well-being. Women with androgen deficiency also reported of experiencing a better sense of quality of life and well-being when treated with testosterone.

Alterations in the growth hormone/insulin like growth factor-I axis have been observed in patients with HIV-associated wasting, including elevated levels of the former and reduced levels of insulin-like growth factor I. In randomized, placebo-controlled studies, rhGH significantly improved lean body mass by ~3 kg compared with placebo ($P < 0.001$) and total body weight by ~3 kg ($P < 0.001$), and was associated with significant improvements in physical endurance and quality of life ($P < 0.001$). Common adverse events with rhGH therapy include blood glucose elevations, arthralgia (36.4%), myalgia (30.4%), and peripheral edema (26.1%), but these usually respond to dose reduction or drug discontinuation. Physicians should be alert to the possibility of wasting in HIV-infected patients receiving HAART and should consider treatment to improve patients' stamina and quality of life. The evidence supports a role for rhGH in the treatment of patients with HIV-associated wasting. Regular blood glucose monitoring is advised when treating wasting with rhGH.

HIV-associated wasting is defined as > or = 10% involuntary weight loss and includes declines in both lean and fat mass. This large (757 subjects), randomized, double-blind, placebo-controlled trial investigated the efficacy, safety, and tolerability of recombinant human growth hormone (rhGH) in 2 doses-0.1 mg/kg up to a maximum of 6 mg daily (DD) or alternate days (AD)-in the treatment of wasting and weight loss in highly active antiretroviral therapy (HAART)-treated HIV-infected subjects. The evaluable population for ergometry comprised 555 subjects, 87.6% of whom were receiving HAART. At 12 weeks, median maximum work output increased by 2.4 and 2.6 kJ in the AD and DD groups, respectively. The median treatment difference was 2.9 kJ for DD vs. placebo ($P<0.0001$). Body weight increased by 2.2 and 2.9 kg in the AD and DD groups, respectively. Corresponding median treatment differences vs. placebo were 1.5 and 2.2 kg ($P<0.0001$). Lean body mass (LBM), by bioelectric impedance spectroscopy, increased by 3.3 and 5.2 kg, respectively ($P<0.0001$ vs. placebo; $P = 0.0173$ DD vs. AD), and fat mass, predominately truncal, decreased. Quality of life (QoL) improved significantly in both rhGH groups. Fluid-retention adverse effects and hyperglycemia were more common in the DD than in the AD group. No significant changes in HIV viral load or CD4 cell count occurred. In conclusion, over the 12-week course of therapy, rhGH, 0.1 mg/kg DD, was superior to placebo in improving physical function, body weight, body composition, and QoL and was superior to AD dosing in restoring LBM.

Major Historical Landmarks of AIDS

- In June 1981, the Centers for Disease Control (CDC) have published a report about the occurrence of Pneumocystis carinii pneumonia (PCP) in five men in Los Angeles5. Probably, this report can be referred as the "beginning report" of AIDS.
- In 1981, first time AIDS epidemic became visible.
- In September, 1982 AIDS (Acquired Immune Deficiency Syndrome) was first properly defined by CDC.
- In November, 1982 the first AIDS organization named as "Terry Higgins Trust" (later known as the Terrence Higgins Trust) was established in the UK. By the same year a number of other AIDS specific voluntary organizations had been set up in the USA including San Francisco AIDS Foundation (SFAF), AIDS Project Los Angeles (APLA), and Gay Men's health Crisis (GMHC).

- In September 1983, the CDC have published the first set of recommended precautions to prevent AIDS transmission.

- In October, 1983 the first World Health Organization (WHO) meeting was held in Denmark and reported that there are 2,803 AIDS cases in the USA at that time.65

- By the end of 1983, the 3,064 AIDS cases and 1,292 death cases in the USA have been reported.

- By the end of 1984, the 7,699 AIDS cases and 3,665 AIDS deaths in the USA, and 762 cases in Europe and 108 cases and 46 deaths in the UK have been reported.

- On October 3rd 1985, the actor Rock Hudson died by AIDS. This was the first major death case of AIDS.

- By the end of 1985, 20,303 cases of AIDS had been reported to the World Health Organization and also 15,948 cases in the USA, and in the 275 cases in UK1had been reported.

- In May 1986, the new name HIV (Human Immunodeficiency Virus), for the causal organism of AIDS came in existence by International Committee on the Taxonomy of Viruses (Coffin et al., 1986).

- In September 1986, the azidothymidine (AZT) was reported to attack on HIV by early results of clinical tests, which is the drastic progress in the provision of medical treatment for AIDS. AZT was first synthesized in 1964 as a possible anticancer drug but it proved ineffective.

- In 1987, the first AIDS specialist hospital ward was opened by Princess Diana in England.

- On 1st December 1988 "World AIDS Day" was announced first time by the Director-General of the World Health Organization.

- By the 1991 summer, another antiretroviral drug deoxycytidine (ddC) was approved by the FDA for patients intolerant of AZT.

- During 1991, the red ribbon became an international symbol for AIDS awareness. The Visual AIDS in New York, Broadway Cares, and Equity Fights AIDS organization established the wearing of a red ribbon as a way for support of AIDS suffered people (Chin, 1991) (Figure 2).

- On January 1 1996, the new Joint United Nations Programme on AIDS (UNAIDS), WHO, UNDP, UNICEF, UNFPA, UNESCO and the World Bank became operational (Garbus, 1996).

- In 1999, According to the annual World Health Report, AIDS had become the fourth biggest killer worldwide.

- In 2001, the Indian drug company Cipla offered to make AIDS drugs at reduced prices to the international AIDS organization Medecins Sans Frontieres (MSF) (Kumar, 2001).

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